

COLUMBIA RIVER WATER MANAGEMENT REPORT

WATER YEAR 1999

SUMMARY

I. INTRODUCTION

- A. PURPOSE
- B. BASIN DESCRIPTION
- C. WATER RESOURCES DEVELOPMENT
- D. TYPES OF RESERVOIR PROJECTS
- E. ANNUAL REGULATION CYCLE

II. HYDROMETEOROLOGY

- A. OBSERVATIONS
 - 1. Weather
 - 2. Snowpack
 - 3. Surface Water Supply Index
 - 4. Streamflow
 - 5. Flood Events
 - a. Winter Floods
 - b. Spring Floods
- B. FORECASTS
 - 1. Runoff Volumes
 - 2. Long-Range Peaks
 - 3. Daily Streamflows

III. RESERVOIR REGULATION

- A. SYSTEM OPERATION
- B. PROJECT OPERATION
 - 1. Mica Dam
 - 2. Revelstoke Project
 - 3. Keenleyside Dam
 - 4. Libby Dam
 - 5. Kootenai River at Bonners Ferry
 - 6. Duncan Project
 - 7. Kootenay Lake
 - 8. Columbia River at Birchbank
 - 9. Hungry Horse Project
 - 10. Flathead R at Columbia Falls
 - 11. Kerr Project
 - 12. Albeni Falls Project
 - 13. Grand Coulee Project
 - 14. Mid-Columbia PUD Projects
 - 15. Yakima Project
 - 16. Jackson-Palisades Project
 - 17. Ririe Project
 - 18. American Falls Project
 - 19. Little Wood Project
 - 20. Owyhee Project
 - 21. Boise Projects

- B. PROJECT OPERATION (continued)
 - 22. Malheur Project
 - 23. Payette Projects
 - 24. Snake R at Weiser
 - 25. Powder Project
 - 26. Brownlee Projects
 - 27. Dworshak Project
 - 28. Clearwater R at Spalding
 - 29. Lower Snake Projects
 - 30. Mill Creek Project
 - 31. Willow Creek Project
 - 32. John Day Project
 - 33. Upper Deschutes Projects
 - 34. Chief Joseph, McNary, The Dalles, and Bonneville Projects
 - 35. Columbia R at Vancouver
 - 36. Willamette Projects
 - 37. Western Washington Projects
 - 38. Oregon Coastal Projects

IV. FUNCTIONAL ACCOMPLISHMENTS

- A. FLOOD DAMAGES
- B. ELECTRIC ENERGY
 - 1. Power Operations
 - 2. Marketing
 - 3. Industry Changes brought about by Deregulation
 - 4. Power Subscription
 - 5. BPA's Fiscal Obligations
 - 6. Energy Licensing and Regulation
- C. IRRIGATION
- D. NAVIGATION
- E. RECREATION
- F. WATER QUALITY
 - 1. Total Dissolved Gas
 - 2. Water Temperature
 - 3. Other Studies and Activities
- G. FISHERY OPERATIONS
 - 1. Actual Operation
 - 2. Spill and Flow for Fish
 - 3. Juvenile Fish Run
 - 4. Adult Fish
- H. SPECIAL OPERATIONS AND EVENTS
 - 1. Vernita Bar
 - 2. Libby-Arrow Swap

V. COLUMBIA RIVER WATER MANAGEMENT GROUP

- A. MEETINGS
 - 1. Meeting Summary
 - 2. Ice Harbor, Lower Monumental, Port of Benton, and Tri-Cities Tour
 - 3. Hydromet Data Committee
 - 4. Depletions Task Force
 - 5. Forecast Committee

VI. TREATIES, AGREEMENTS, AND ACTIVITIES

- A. COLUMBIA RIVER TREATY
- B. PACIFIC NORTHWEST COORDINATION AGREEMENT
- C. SYSTEM OPERATIONS REVIEW
- D. CANADIAN ENTITLEMENT ALLOCATION EXTENSION
- E. SYSTEM CONFIGURATION STUDY

VII. OPERATING PLAN FOR 1999-2000

- A. GUIDELINES AND RULE CURVES
- B. SPECIAL REGULATIONS UNDER ESA

VIII. CONSTRUCTION AT MAJOR PROJECTS

- A. FEDERAL PROJECTS
- B. NON-FEDERAL PROJECTS

APPENDICES

- A. Glossary
- B. Abbreviations
- C. Pertinent Data on Selected Projects
- D. Charts

TABLES

- 1 Monthly Precipitation Totals by Subbasin
- 2 Accumulated Monthly Precipitation Totals by Subbasin
- 3 Basin Average Monthly Temperatures
- 4 Oregon Surface Water Supply Index (SWSI)
- 5 Streamflow as Percent of Monthly Normal
- 6 Mean Annual Discharge
- 7 Modified Discharge and Runoff, Columbia River at Grand Coulee, WA
- 8 Modified Discharge and Runoff Snake River at Lower Granite, WA
- 9 Modified Discharge and Runoff Columbia River at The Dalles, OR
- 10 Modified Discharge and Runoff Willamette River at Salem, OR
- 11 Winter Flood Peaks
- 12 Spring Flood Peaks
- 13 Forecast and Observed Runoff
- 14 Unregulated Runoff Volume Forecasts
- 15 Monthly Forecasts vs. Actual Runoff, 1970-99
- 16 Forecast and Observed Peak Flow and Stages
- 17 End of Month Reservoir Status and Rule Curves
- 18 Summary of Flood Damage Observed and Prevented
- 19 Effect of Reservoir Regulation on Flood Peaks and Damages 1948-99
- 20 FERC License Activities by State
- 21 Actual Spill Operations for Juvenile Fish Passage
- 22 Summary of Fish Disposition at Collector Dams
- 23 Juvenile Fish Transport by Project, 1978-99
- 24 Yearly Adult Fish Counts
- 25 Project Seasonal Operational Guidelines

FIGURES

- 1 Columbia River and Coastal Basins Map
- 2 Willamette River Basin Map
- 3 Western Washington Map
- 4 Southern Oregon Coastal Basins Map
- 5 Pacific Northwest Reservoir System Schematic
- 6 Annual (Water Year) Precipitation Map
- 7 Accumulated Monthly Division Precipitation
- 8 Water Year Precipitation by Division, 1977-98
- 9 Columbia Basin Average Snowpack
- 10 Mountain Snow Water Content Map, April 1
- 11 Sources of BPA Energy
- 12 Profile of Lower Columbia-Snake Rivers
- 13 Location of Dissolved Gas Monitoring Stations